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East Europe Report

ECONOMIC AND INDUSTRIAL AFFAIRS

No. 1941



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CEMA ACTIVITIES IN FIRST HALF OF 1979 ASSESSED

Warsaw RYNKI ZAGRANICZNE in Polish No 107, 5 Sep 79 p 1

[Article by (jz): "Difficult Half Year"]

[Text] Implementation of the socio-economic tasks contained in this year's plans of the CEMA states occurred under exceptionally difficult conditions in the first half-year [of 1979]. These were tasks, in addition, which were especially of a marshalling nature. In establishing them, recommendations and decisions made at the national economic conferences and plena of the central committees of the communists and workers' parties, devoted to a great extent to the assessment of the progress in the five-year plans, were taken into consideration. These comprehensive analyses facilitated a more fuller harmonization of the development of the particular fields of the economy as well as concentration of means for the solution of key current and future problems.

The reduction in the rate of investments as well as the more effective use of outlays, among others, was supposed to contribute to the maintaining of proper ratios of economic development. This referred especially to increasing the expenditures for the reconstruction and modernization of the existing production potential, reducing the amount of new construction, and accelerating the activation of completed installations. A yet greater attention was given to rational management of the manpower reserves and also of raw materials and fuels.

In this year's plans of the particular countries, decisive actions in the direction of balancing trade exchange through the acceleration of exports and rationalization of imports were anticipated. Intensification and expansion of the international division of labor tasks within the framework of the Council for Mutual Economic Assistance were at the top of the list.

Considerable attention was paid also to the stabilization of the internal market and fuller meeting of the constantly rising material and cultural needs of the populace.

Discovery of new material reserves and the improvements made in the system of organization and management of the economy were to insure the maintaining of

a significant rate of economic growth. The majority of the CEMA states planned to achieve a higher rate of national income this year than in 1978.

Unusually disadvantageous atmospheric conditions during the winter period disrupted the rhythm of production, especially in the countries of Central Europe. Severe frosts and snowfalls made the work of industry and transport difficult and caused substantial losses in agriculture and resulted in delays in carrying out the planned trade turnovers. Another phenomenon which impacted negatively on the economic development of the socialist community states was the bad business condition persisting in the world economy as well as the continuing price rise of many articles imported from outside the CEMA area. This made the balance of trade exchange difficult. Thus, the production effects obtained under these conditions can be recognized as a great achievement.

Of the European countries, the most rapid rate of growth of industrial production was being maintained in Romania where productivity was higher by 8 percent than in the first half of last year [;978] as well as in Bulgaria (plus 6.7 percent). In the other CEMA countries the rate of industrial production in a comparable period fluctuated between 4.4 percent and 0.6 percent. The increase of industrial production, of course, is not spread equally over all sectors. Machine industry and light industry production increased significantly, while serious difficulties in carrying out the production tasks occurred in the energy-absorbative sectors, especially in chemistry and also in the cellulose-paper industry.

The unfavorable climate reflected particularly adversely on the level of agricultural production. In fact, the complete results are not yet available, however, preliminary assessments in many countries indicate that the level of vegetal production, especially grain production, will be lower than a year ago. At the same time, the published communiques point to an increase in the farm animal population.

There was a pronounced curbing of the rate of investments in the first half year. It is partly the result of the intentional action of the CEMA states, aimed at discounting the huge investment outlays sustained in the past years; however, it was partly caused by the winter conditions which made construction work difficult. The level of investment outlays increased significantly only in Cuba (plus 8.3 percent) and in Romania as well (5.8 percent). In the majority of the other member states it was in the neighborhood of the results in the first half of 1978. Bulgaria, Poland, and Mongolia limited investment outlays substantially.

Also, the situation in the foreign trade of the CEMA states was not shaping itself uniformly. Generally, the rate of growth of trade exchange was considerably higher than industrial production, which attests to the further active inclusion of the member states in the international division of labor. For example, in Bulgaria, the foreign trade turnovers increased in the past half year by 15 percent in relation to the corresponding period of 1978. In the Soviet Union, foreign trade reached a value of 9.8 percent, and that of

Czechoslovakia - by 7.3 percent higher. In the GDR an increase in exports by 7 percent was noted while sales to the Soviet Union increased by 9 percent. The communiques published in the press of the CEMA countries indicate that the actions countering the results of the unfavorable development of prices are increasingly more stimulative. Nevertheless, it was not possible to bring about the planned balancing of trade exchange.

The first half year [of 1979] results demonstrate the effective operation of the economic mechanisms on behalf of the implementation of tasks set down in the plans. Nonetheless, however, the fact that in many cases the attained rate of development in the particular divisions of the economy in the first half year is below the rate assumed for the entire year, the need for a significant increase in production effort in the current half year is created.

CSO: 2600

POLISH, CZECH TU LEADERS MEET

Warsaw GLOS PRACY in Polish 30 Aug 79 p 1

[Article by Eligiusz Lasota: "Friendly Talks by the Leaders of the Polish and Czech Central Trade Unions"]

[Text] (Stary Smokovec--our own information)--Talks by the members of the Secretariats of the Central Council of Trade Unions (CRZZ and URO) took place on Wednesday [29 August 1979] in Smokovec [in Slovakia] with the participation of the CRZZ Chairman, Wladyslaw Kruezek, and URO Chairman, Karel Hoffmann.

Both chairmen gave speeches in which they presented the current problems of socialist construction in our countries and discussed the main tasks of the trade union movement.

The meeting in Smokovec is to serve as preparation for the further program of cooperation of the trade unions of Poland and Czechoslovakia.

On Wednesday the Polish guests visited social facilities in the foothills [of the Tatra Mountains] region and also familiarized themselves with the rest centers being built. On the program of the working visit of the members of the CRZZ leadership also were talks with the trade union activists of various echelons devoted to the mutual exchange of experiences.

The members of the CRZZ and URO Secretariat also discussed the problems of the further development of trade union cooperation of both countries.

CSO: 2600

STRESS ON QUALITY PRODUCTION CONTINUES

Deputy Minister for Metallurgy Comments

Bratislava PRAVDA in Slovak 14 Aug 79 p 3

[Article by Jaroslav Veverka, Deputy Minister for Metallurgy and Heavy Engineering: "Qualitative Indicators Are Decisive"]

[Text] The difficult energy situation at the beginning of this year also considerably influenced the fulfillment of planned tasks in the department of metallurgy and heavy engineering. The endeavor of the leadership, the party, trade union and youth organization and all the department workers was to liquidate production shortages representing Kcs 1.2 billion in the shortest time possible and to contribute to the restoration of disrupted supplier-customer relations and the dynamics of national economic development.

Measures adopted on the basis of analysis of the situation in the VHJs [Economic Production Units] and the department's enterprises to offset the January shortages proved effective as early as in results of the plan's fulfillment for the first quarter.

With organizational effort, changes in work hours, and the people's great self-sacrifice it was possible in February and March to decrease the January production shortage by one-half. This may be attributed to a considerable extent to workers in the Kovohuty Sigma VHJ, Cs Vagonky [Czechoslovak Railroad Cars] and CKD [Ceskomoravska-Kolben-Danek National Enterprise (Heavy machinery plants)] Dukla who made up the planned production volume within a relatively short time. Great attention was devoted to the delivery of machinery and equipment for investment construction in the fuels branch which was greatly exceeded in the first quarter; this was positively influenced especially by the Vitkovice VHJ's deliveries to the North Bohemia Lignite Mines (the Chabarovice mine, the Most second construction, the CSA Mine second and first construction, and others). Favorable

development also continued in the second quarter so that as of 30 June the department of metallurgy and heavy engineering fulfilled the semi-annual planned production of goods by 100.1 percent.

The offsetting of individual shortages by purposeful work with full understanding of the national economic needs is credited on the one hand to workers in the heavy engineering enterprises who secured fulfillment of a large share of the annual production plan (51.2 percent) and, on the other hand, to workers in the metallurgical works and ore mines who exceeded the adequate production share by the amount of Kcs 116 million.

During the first half-year the planned dynamics of production development was successfully restored. Compared with the same period of last year, production growth was somewhat higher than planned.

The number of organizations which are not fulfilling the plan decreased from 81 in January to 19 by the end of June. Those experiencing shortages of more than one-half are the Kovosrot enterprises in Prague, Decin, Bratislava and Brno where a smooth supply of metal scrap to metallurgical plants and the fulfillment of other tasks are encountering difficulties in railroad transportation. Among other enterprises which have considerable shortages are mainly the Zeleznorudne Bane [Iron Ore Mines] National Enterprise in Spisska Nova Ves, the Slovak Magnesite Plants in Kosice, the NHKG [New Klement Gottwalds Metallurgical Works] in Ostrava, Valcovne Plechu [Sheet Rolling Mills] in Frydek-Mistek, and Drotovna [Wire Mill] in Hlohovec.

To insure volume fulfillment, the department is devoting extraordinary attention to assortment, the fulfillment of qualitative indicators, and other important tasks.

The development of prospective production, the so-called development programs, proceeded in the first half-year according to plan which was fulfilled 100.8 percent. In comparison with last year they increased by 16 percent. Production in branches which are of extraordinary significance to the solution of our energy situation was developing well; the production of equipment for nuclear power plants increased by 2.15 percent and machinery for surface lignite mining, by 61.3 percent. The production of spare parts for wheel excavators and overburdened dumping machines increased by 44.3 percent.

The attention of the VHJs and enterprises is constantly oriented toward systematic improvement of the plan's fulfillment as to assortment which, compared with the January fulfillment of 86.45 percent, gradually improved up to 97 percent as of the end of June. This may be especially attributed to the Kovohuty VHJ, the ZSE [High-Voltage Electrical Engineering Plants] in Prague, Sigma in Olomouc, and the Czechoslovak Air-Technological Works.

Remaining below the department's average are especially the RBMZ [Ore Mines and Magnesite Plants] VHJ in Bratislava, Skoda in Plzen, and Chempos where it will be inevitable to improve the plan's fulfillment as to assortment.

The department also successfully coped with planned tasks in the main directions of utilizing production, that is, in deliveries for export and investment construction; it fulfilled the plan for deliveries to the socialist countries by 113.4 percent and to the nonsocialist countries by 119.2 percent in freight prepaid prices. In investment deliveries the semiannual plan was fulfilled 108 percent but the achieved share of the annual plan shows an imbalance in the distribution of deliveries during the year and the considerable task which remains for the second half-year.

The department's results characterizing the qualitative aspect of the production process were an indisputable success. Despite the unfavorable influence of the extraordinary situation in January, we succeeded in mobilizing further reserves to secure the planned bases thus with the fulfillment of the performance plan for the first 6 months, the January shortage in profits (Kcs 447 million) dropped to Kcs 10 million.

The growth rate of labor productivity was restored; it increased by 2.7 percent. With the exception of RBMZ in Bratislava the other VHJs insured the planned labor productivity. Supplies on hand ranged under the limits set for this year and as of 30 June of this year they were at the level of supplies on hand at the beginning of the year.

The department of metallurgy and heavy engineering is striving to cope with this year's demanding tasks not only in the fulfillment of production tasks as to volume but in all of the other indicators of the state plan. For this purpose the VHJs and enterprises elaborated comprehensive sets of measures whose goal it is to get over the bottlenecks in insuring the plan for 1979.

Worker Responsibility for Rejects

Ceske Budejovice JIHOCESKA PRAVDA in Czech 14 Aug 79 p 4

[Article by JUDr L. Jouza: "A Word With a Lawyer. Indemnity for Rejects"]

[Text] The employee's responsibility for damages which he caused by producing a reject is regulated in the Labor Code differently from other types of material responsibility because of the fact that in the manual activity of production there is a much greater work risk. Therefore, this extent of responsibility is narrower and a different amount is set for damages

caused to the organization in connection with the production of a reject in material, wages, or as the case may be, in connection with the necessary repair of machinery which was damaged by the production of a reject.

For the purpose of ensuring the required quality of products and decreasing the number of rejects a minimal limit for establishing the amount of indemnity was introduced. Many economic leaders, however, do not realize the full application of this regulation and they consider the application of material sanctions against workers an unpopular measure which impedes their cooperation with the collective. They would rather leniently tolerate a breach of technological and production discipline which is the main source of bad quality in production.

Rejects often reach the millions; nevertheless, many organizations so far have not given it a great deal of attention. They fail to ascertain the workers' responsibility for rejects and to adopt suitable measures which would lead to their decrease.

There are numerous deficiencies especially in applying the amount of the indemnity. As a matter of principle the worker is obliged to make up for the full indemnity caused. However, if the amount of damage exceeds one-half of his average earnings he is obliged to compensate for damage only up to this one-half. If a reject was produced by an excusable fault of the worker who is otherwise conscientious the organization may appropriately reduce the indemnity but the amount of indemnity must be at least one-third of the actual damage. In damages exceeding one-half of the average monthly earnings of the employee the indemnity must be in an amount equal to at least one-sixth of his average earnings.

11360

CSO: 2400

ALREADY EXTENSIVE TIMBER RESERVES INCREASING

Usti nad Labem PRUBOJ in Czech 28 Aug 79 p 2

[Article: "Wealth of Our Forests"]

[Text] The CSSR has extensive wealth in timber in comparison with other countries. Whereas the worldwide share of forests represents 33 percent, 4.5 million hectares are forested in our country, which is 35.2 percent of its total area.

The main part of the forests, roughly 95 percent, is in the uplands and the mountains. West Bohemia is the most densely forested kraj in the CSR with forests covering two-fifths of its area; Central Slovakia is the most densely forested kraj in Slovakia with almost one-half of its area covered by forests.

We are among the leading European states also with regard to reserves of timber representing more than 190 solid cubic meters per hectare. The largest reserves per hectare are in the North Moravia Kraj--244 solid cubic meters--and in the South Bohemia Kraj--204 solid cubic meters. These sources ensure--provided that they are constantly renewed--sufficient quantities of timber to cover society's wants without interfering with the production base. In view of the fact that exploitation does not reach the total volume of timber growth, the reserves of timber in our forests are steadily increasing.

Care for existing stands, reduction of self-renewing and overaged growths, which are not very productive, and continuous forest renewal will serve to sustain this development in the future. An area up to 45,000 hectares is being reforested every year. Twenty five thousand hectares of self-renewing and overaged stands will be eliminated within this Five-Year Plan. Foresters are also starting to fertilize growths and to increase the share of seedlings bred from improved seed stock. As a consequence, they are gradually increasing the acreage of nurseries. Whereas there have been 116 hectares of nurseries in the CSSR at the beginning of this Five-Year Plan, their acreage is supposed to double by 1980.

CSO: 2400

CZECHOSLOVAKIA

BRIEFS

SSR SUGARING SEASON STARTED--Four sugar refineries--in Trnava, Sladkovicovo, Dunajska Streda, and Trebisov--started to process sugar beets yesterday. They have a sufficient quantity of workers at their disposal for the campaign. The Trnava sugar refinery is expected to process 2,620 tons, Sladkovicovo 1,900 tons, Dunajska Streda 4,000 tons, and Trebisov 2,000 tons of sugar beets daily. Workers of the sugar refineries in Slovakia continue intensive procurement of sugar beets and in establishing a five-day supply. Presently, the Trnava workers are doing best since they had a five and or half-days of sugar beets supply as of yesterday. After 10 October--when the sugar beet will reach the highest stage of its ripening process--the sugar refineries will accelerate their rate of procurement. [Text] [Bratislava PRACA in Slovak 21 Sep 79 p 1]

CSO: 2400

ECONOMY STRAINED BY PROSPECTS OF PRICE INCREASES

Greater Outlays for Subsidies

Frankfurt/Main FRANKFURTER RUNDSCHAU in German 5 Sep 79 p 13

[Unattributed report: "Political Prices to Moderate GDR Price Increases; Stability 'Successes' Have Thus Far Cost East Berlin Seven Billion Marks in Subsidies"]

[Text] Firm prices for essential foods and low rents: For GDR planners and politicians these have always been the signs of success for the planned economy. These "successes" have been so crucial to the state that billions of marks from tax revenues were earmarked for price subsidies. Still, rising raw material prices which have already caused inflation in other nations of the Eastern economic community have now begun to affect the GDR also. For some time past the media has prepared the citizens for higher prices. There also have already been some hidden price rises--the content of packages has been reduced. In the opinion of observers durable consumer goods will become more expensive either this fall or early next year. The "political prices" of bread, potatoes, sausage and butter, though, are to be kept stable in future also. In the first 6 months of this year the GDR spent nearly M7 billion on price subsidies; maintaining the "political prices" will burden the budget even more.

After celebrating its 30th anniversary on 8 October, the GDR will be compelled to wave goodbye to a myth of long standing: In the country of stable prices also there will be drastic increases. The public has long anticipated the imminent decisions, this at least is plain from talks with people at the Leipzig Autumn Fair. Prices have been discussed in the factories for weeks, and nobody is likely to be surprised. The only question remaining is the timing. Two hypotheses are championed: Either the price hikes will come in

the fall to drain purchasing power at the time of Christmas shopping, or their imposition will be delayed until early 1980 in order--for political reasons--to preserve a decent interval after the GDR anniversary celebrations.

In fact inflation has already arrived. Due to the drastic rise in raw material prices on the world market, which did not spare the Eastern Bloc either, many consumer goods have simply become more expensive in recent weeks. According to reports by GDR citizens higher prices for textile goods in the stores were officially justified by the introduction of new fibers and fabrics. Bedlinen--of which there had been a shortage in the GDR for months--suddenly reappeared in store windows at double the previous price (M160). It is also claimed that the prices of many foodstuffs were raised by way of new packaging, allegedly new products and reductions in package content. Observers also noted a significant upward trend in rents: In East Berlin three-room apartments in new buildings are now offered at M320. It was said in Leipzig that rising fuel and administrative costs are being passed on.

Untouched so far have been the "political" prices. Essential foods such as bread and potatoes, gasoline and fares in public transport are subject to particularly close scrutiny by the public.

For months past GDR citizens have been prepared for drastic price hikes by way of exceptionally elaborate media reports on inflation in the socialist neighbor countries. According to GDR citizens many people tended therefore to buy cheap consumer goods without actually needing them at this time. It is quite obvious that the GDR economy cannot avoid price increases. In the first 6 months of 1979 the government was compelled to raise its price subsidies by 7.5 percent to M6.9 billion.

Disappointment is likely to be the fate of those who hoped to be offered a consumer feast in celebration of the 30th anniversary. As an official from the Federal Republic put it at the Leipzig Fair, "there will be no gift package."

Higher Prices at Leipzig

Born DIW WELT in German 8/9 Sep 79 p 1

[Report by H.-R. Karutz from the Leipzig Fair: "I Love My Leipzig, but Not Its Prices"]

[Text] Goethe's image smiled down on us. "Give me my good old Leipzig," these words by the great German blink red in Gothic script from the rooftop of a fair building: Goethe in neon tubes.

At the banks of the Pleisse the GDR shows off all it has: Lively markets flourish even outside the fair buildings--Leipzig acts as the socialist shopping plaza of this late summer.

For the sake of the fair socialism donned more relaxed garb: On Thursday Leipzig housewives formed long lines. In an entrance way, at the approaches to the fair grounds, bananas were on sale: "15 per kg" was the price proudly quoted by a pensioner who served as temporary salesman.

Across the street at another stand determined Leipzig women pounced on jeans: Trying on by rule of thumb. The denim pants from the Far East cost M24. Children's T-shirts with blue circles and the logo "Olympia," cut according to Western fashion, were available for M7.55.

"After all, we can leave again if it's too expensive." With these words a Leipzig housewife pushes her husband into one of the expensive "Delikat" candy stores in the fair grounds. Dresden marzipan at M27, a package of cocoa at M7.50, Kombo, a powdered vitamin drink, at M7.50. Many turn away: "I would not dream of spending that much."

Leipzig women sort through the merchandise in the Eva Boutique as if this were the summer sales. Scarves for M8.50, belts and silk jersey blouses for M80 are most popular. A virtually empty men's wear store across from it--the GDR male is still preoccupied with more basic issues.

Compared to rather Spartan East Berlin, Leipzig displays what amounts to southern features. Strolling in the late summer's sun, a quartet of musicians in gray bowler hats dreamily and slowly plays an old folksong in front of the old city hall. That pleases the public no less than the Western slogans on blouses and sweaters. Marching through Leipzig are "Nevada Rangers" and "Motoguzzi Teams." Still, the continuing GDR hit is jeans and more jeans: Wide suspenders worn with the denim pants from overseas are the latest fashion.

New lines form just outside the entrance gates to the fair: Romanian grapes at M3.60 per kg are the attraction. Inside the young people of the Saxon metropolis seem secretly to have arranged for a competition of Western shopping bags: "Kaufhof," a shoe store in Bavarian Kempten, the BBC Corporation --the plastic bags are filled to the brim with the latest advertisements for headache remedies.

Polo and Rabbit (VWs) flags are waving above the "Street of Friendship." "We could have brought 10 freight car loads--and we still would not have had enough brochures," a VW employee consoles a disappointed visitor. A friendly Russian takes a pennant with the Olympic bear from his briefcase and gives it to the people from Wolfsburg. A prospective GDR buyer carefully notes all the details of the import regulations for the VW cars on display. He is obviously able to read mirror writing, because the regulations are affixed to the inside of the windshields. Even SED comrades with their pigskin attache cases bend over the Rabbit. full of interest: "An antiroll bar is mandatory," says one of them, touching the black metal.

"I was crazy about getting a Rabbit, but nothing doing," complains a visitor. "Well, it's not our fault," says the VW salesman. "Ten thousand Rabbits simply are not enough to meet the GDR demand."

The domestic "Volkswagen," Trabant and Wartburg, are displayed in nicer surroundings than those provided for their Western competitors: But none of them display open trunks or hoods, nor do they offer any brochures--at a waiting time of 7 years any advertisement would be plain silly. The only novelty item: A Trabant made of glass.

Leipzig night life suffers from lack of accommodation: "Sold out," says the haughty doorman at the Tivoli Nightclub, shepherding curious black visitors from the lobby. Outside stands a large American car, resplendent in metallic paint and with a West German registration.

In the suitably furnished Thueringer Hof a group sings all-German youthful plaints: "Life means that many things go wrong..." A portrait of a young and smiling Honecker looks benignly from the wall.

The economy: Leipzig hopes

11698
CSO: 2300

FIVE YEAR PROGRAM TO WINTERIZE RAILROADS VIEWED

Warsaw SYGNALY in Polish No 33, 15 Aug 79 p 4

[Article by Benedykt Czekala]

[Text] Apart from wartime, the efficiency of the Polish State Railroads (PKP) has never been as low as in January and February 1979. Each of the four successive attacks of this exceptionally frosty and snowy winter has been especially hard on the railroads. One-hundred eighty-seven trains were stalled in the snow-drifts, 96 trains were disrupted, and there were 312 derailments of the rolling stock. There were 271 locomotives and traction sets which were put out of circulation due to defects. The contact system was disrupted in 302 places. There were 684 railroad traffic safety devices damaged. Disruptions in rail traffic occurred on many lines in Pomorze, North, West, Central, and East Railroad Districts, and even the Tarnowskie Gory-Gydnia Coal Trunk Line was paralyzed.

It was decided that proper conclusions be drawn for the future from this painful experience. The recent action of SYGNALY, carried on under the motto "It could be done also that way," was likewise helpful.

The experts of the Ministry of Communications, the Central Institute of Research and Development of Railroad Technology, District Directorates of State Railroads, and Regional Directorates of State Railroads investigated the causes of the disruptions suffered by the railroads. Based on the results of this analysis, they have mapped out a program of technical and organizational measures to be taken in 1980-1985, whose implementation should make PKP in the future more resistant than hitherto to frost and snowstorms.

It was established that to more effectively protect the railroad lines from blizzards one should extend the length of hedge-row sections along the tracks from 2284 to 3262 km and one should plant protective belts of trees and shrubs along the tracks to the extent of 150 km annually; one should likewise increase the extent of snow-fences from 8.4 million to 11.7 million.

It is necessary to augment and modernize the equipment needed to clear snow off the stations and PKP lines. At present the PKP has 195 snowplows and needs 276 of them, including 32 rotary ones. Annual supplies to the PKP should include 16 new snowplows. As new equipment is supplied, it is intended to withdraw from use the worn-out and obsolete snowplows; 107 such plows are to be condemned. By 1985 the number of Soviet PSE combines should be increased from 25 to 60 and that of Polish snowplows from 209 to 409. Last winter, the Czech OMS machines passed triumphantly their hard tests. In the current year the Ministry of Communications intends to buy from Czechoslovakia four such machines. It is also expected that next year these machines will be already produced in Poland (20 annually); 211 of them are needed.

It is proposed to increase the number of sidings, equipped with electric heaters, from 11,400 to 35,000 and with induction heaters from 23 to 6,000; that way almost 50% of siding will be equipped with electric and induction heating devices. An increase is also envisaged in the number of gasoline apparatuses for defrosting siding, from 2,900 to 5,400. The use of 414 tampers adjusted to crushing ice is being planned. Efficient organization of snow removal depends on communication, especially on radiocommunication. It was decided that all new plows and snow removal machines will be equipped beginning at once with radio telephones. These apparatuses will also be installed on plows and machines already in use during their servicing. It is estimated that the number of walkie-talkies used by railroadmen should be increased from 2020 to 8420 (annual increase-100).

The PKP roadmen need 670 WM 10 and 312 WM 15 motor trucks. This can be achieved on condition that 100 WM 10 and 50 WM 15 will be built annually. It is being planned to purchase snowmobiles for road service workers and to ensure traffic and communication security.

The drains should be established on 193 stations at a rate of 30 stations annually. The waterpipe and power network is still to be installed in 29 stations. The roofs of railroad buildings, totalling 1.5 million m², need to be repaired; 220,000 m² of roofs will have to be repaired annually.

Up to now only one breakstone base was provided with equipment for defrosting ballast. Six more such bases are needed.

Within the next few years the railroads should be getting annually: 11 heaters for drying electric engine insulation of traction vehicles; 10 apparatuses for the detection of flat spots on the rolling stock wheels; 5 machines for turning wheel sets; 5,000 408-W type coal cars adapted to defrosting bulk freight.

The Central Institute of Research and Development of Railroad Technology has worked out the project of changes to be made in the water supply system of the passenger rolling stock to make it resistant to low temperatures. It is proposed to locate the washbowls and lavatory bowls in places not exposed to intense cooling, and provide for the heating of water in tanks and elimination of valve leakage. This should prevent the freezing of drain pipes. It is to be hoped that before the next winter it will be possible to satisfy a part of long standing PKP requirements

for various technical equipment. This concerns, especially, the purchase from the USSR of further PSE snow removal combines, adaptation of the next SDPM plows to the PKP clearance gauges, design improvement of the Stargard 411 S plows, construction of 10 moldboard plows, 32 OMSA snow plows, 15 "drums" (self-propelling cars with drums for the removal of the icing of traction network), and the production of 1686 sets for the electric heating of turnouts by the Katowice ZWUS, and of 400 induction switch heaters by the Krakow KZZRiL.

The traction workers hope for the planned supply by the ZNTK [Railroad Rolling Stock Repair Shops] of 242 Sp heaters for drying engine insulation. They also look forward to modernization of ventilation systems in ET 21 locomotives (upon their overhaul in ZNTK) and more effective materials for insulation of electric machine rotors.

1015

CSO: 2600

SOIL SCIENTIST URGES BETTER USE OF MACEDONIAN LAND

Skopje NOVA MAKEDONIJA in Macedonian SABOTA Supplement 18 Aug 79 p 1

[Interview with Dr Dimitar Popovski by Risto Markovski]

[Text] A major part of the wealth of Macedonia is found in its bright southern sunshine. In cruel Africa that hot sun would not represent any sort of advantage; but in the heart of cold Europe, with its enormous insolation and energy, it represents inexhaustible capital which should be utilized in a rational manner. This southern climate and insolation gives the best opium in the world. It gives us the loveliest silk, as well as stalk rice that is better than the best. Peanuts, anise, grapes, vegetables and early fruits are all cultivated in this region with its southern sun in the heart of Europe.

These fragments noted down from a scientist several decades ago were the first words of our interview with Dr Dimitar Popovski, a well-known Macedonian scientist in the discipline of pedology.

[Popovski] I think the scientist who several decades ago spoke of Macedonia's agricultural wealth was right. Macedonian practice and science have confirmed these views, but modern pedology, together with the strong southern sun and the soils, strives to be a factor that will increase Macedonia's already great wealth in agriculture.

In this manner, Dr Popovski directed the conversation to a very crucial theme: How can the soils be preserved and improved? In utilizing the soils, how should one consider the coming generations? What about the increased population of the future? That is a certainty, and the amount of land will remain in the present limits.

New Warnings

[Question] Dr Popovski, who has a wealth of international experience in pedology, and is associated with Academician Filipovski and other researchers, stressed that it is high time for the voice of the pedologists to be heard concerning soil utilization.

[Question] What is involved here?

[Answer] There are instances where in Macedonian cities industries have been built on the richest soils. Such is the case with the Zhelezarnica Steel Plant and Ohis, and many other plants in Skopje, with the smelting plant at Titov Veles, and with other plants elsewhere in the republic. Similar improper land utilization has occurred in housing construction.

In addition, to all that, it is high time to undertake an evaluation of soils. Instead of using the best land for various purposes, we should be evaluating the proper agrotechnical measures to apply to each soil type.

Domestic science has the task of assuring continued cultivation of the soils at highly productive levels.

[Question] The warning of Dr Popovski should be heeded. He is a researcher with more than 60 published works to his credit. He has been the director of the Agricultural Research Institute for Soil Study, and as a UNESCO expert he worked for 3 years in Iraq. In the integrated institute they strive to prepare personnel for pedology. His special interest has been the protection of alkaline soils. As the pedologist pointed out, currently efforts are being made in Macedonia to achieve comprehensive research projects that together with the strong sun will help to exploit the wealth hidden in the soil. For as Dr Popovski stated, the sun can truly be a natural treasure only if it is used on a scientific basis for abundant production from domestic soils.

The Task of Soil Maps

[Answer] In 1965 we began to carry out the project of developing a soil map of Yugoslavia. Within the framework of that project a soil map of Macedonia will also be developed. This enormous research project, which is to be completed by 1986, is being carried out by scientific self-management interest communities.

[Question] Since he is responsible for the implementation of this research project in Macedonia, we asked Dr Popovski about the basic aim of this research.

[Answer] We hope to become acquainted with the soil inventory. In addition, there will be study of the genesis and formation of particular soils, and attempts to define the properties of soils. Of course, that will be a good basis for determining the ways in which they should be utilized.

[Question] Will the soil map have significance only for progress in scientific agriculture?

[Answer] Of course, it will enable Macedonian agriculture to make new strikes, but the soil map also has significance for other purposes, such as the development of the highway system, planning of airports, the expansion of improvement undertakings and the like. I want to stress that the

preparation of the soil map will be part of an effort that has international dimensions. For our domestic practices, the map will be of particular significance, since it will provide basic features of the soils, their properties, distribution, etc.

The pedological composition in Macedonia varies, and various soil types are encountered. In addition to chestnut soils, there are muck, brown soils, loams, aluvial and deluvial soils, humus and skeletal soils. All of these have varying economic importance, especially for agriculture.

In the conversation with Dr Popovski we got the impression that soils from essentially all the regions of the republic were the subjects of his scientific observations. He had prepared classifications for the soils in the Skopje plain, a survey of hydrobiological conditions of the soils on the Skopje plain, a pedological chart of the level lands on the right bank of the Vardar river, and soil types in the Ohrid plain. Among other things, his scientific interests include the land of the Belchis plain and soils in the vicinity of Debar, Kichevo, Gostivar, Krushevo and elsewhere. From all of this it was not hard to conclude why Dr Popovski has been entrusted to direct the preparation of the first soil map of Macedonia.

Bistra and Other Mountains Can Be Utilized More

In the domain of Dr Popovski's pedological interests are included mountain soils. This scientific interest is motivated primarily by facts such as the following:

Macedonia has about 830,000 hectares of pasture. The capacity and herbal composition of these pasture lands could be significantly greater and of higher quality with improvement measures.

Among other things, we noted that Dr Popovski displayed a special interest in the high alpine pastures of Bistra and the Maleshev mountains.

Bistra Mountain has about 17,000 hectares of pasture. Annually about 40,000 sheep are maintained on those pastures, but the capacity could be much greater.

[Question] What do you regard as the key factor for animal husbandry on Bistra Mountain, where there is a long herding tradition?

[Answer] Improvement measures for the pastures are needed. Bistra has specific climatic conditions, which make it possible to have a longer pasturing period in comparison to other nearby mountains.

[Question] In practice what do you recommend for studying the soils of the Maleshev mountains?

[Answer] On the basis of laboratory and field investigations, we have concluded that applications of phosphorus and nitrogen fertilizers offer one of the most important measures for improving yields on natural and agricultural grasslands. It appears that clearing of natural grasslands and replanting with mixtures of grass and clover gives good results.

These and a number of other undertakings and the latest contributions in the area of erosion control for the land are being carried out by Dr Popovski and his colleagues. He gives priority to team efforts, and to the development of science in general, especially respecting the most demanding scientific undertakings, for they represent the future.

A Look at the Future

We began the conversation with Dr Popovski with a scientist's description from a number of decades ago, which our distinguished pedologist indicated was still valid now. Therefore, we asked him to say something about soil utilization in the future.

[Answer] We have warmth and warm soils. We are beginning to implement significant systems for soil improvement. If the proper use of water is made on Macedonian soils, very high yields can be achieved. Special attention should be devoted to the crop rotation patterns. There we should eliminate a certain conservatism that we have, and the patterns of crop rotation should be changed where there are irrigation systems. We should introduce crops which give high yields.

Finally, I would conclude by saying that various industrial and other uses should not take fertile soil areas, which should be conserved more purposefully. Fertile soils are after all our best future. The bright sun shining on good soils will be transformed into true wealth.

12131

CSO: 2800

OIL-GAS EXPLORATION, PRODUCTION, MARKETING, TRANSPORT FOR 1978

Zagreb NAFTA in Serbo-Croatian No 6, Jun 79 pp 255-271

[Excerpts from article by Vilim Boranic et al.*: "Brief Survey of the Yugoslav Petroleum Industry's Activity in 1978"]

[Excerpts] Petroleum production in 1978 increased only 3 percent over 1977, while production of natural gas rose 2 percent. In 1978 production of petroleum exceeded 4 million tons (precisely 4,076,000 tons). Petroleum refining increased 2.9 percent, and consumption of derivatives rose all of 15 percent.

The share of nonenergy consumption in total consumption of petroleum derivatives was 10.4 percent.

1. Results of Exploration by INA-Naftaplin

In 1978 there was significantly more intense exploration for petroleum and gas in the regions of the Pannonian Basin, the Dinarids and the Adriatic. In addition geological-geophysical data were processed from several angles because of the need to pinpoint new localities for exploratory drilling and for geological correlation of the exploration work that has been done.

1.1. Pannonian Basin

Activity was intense at localities where petroleum and gas deposits have been discovered (Molve, Cvetkovec, Stefkovica, Leticani, Klokocevcı and Obradovci) so that these fields of hydrocarbons can be turned over for engineering and technological analysis. Prospecting was also done at promising localities in order to discover any new petroleum and gas deposits which would have commercial significance. Thus in the Drava Depression commercially promising accumulations of gas were found with traces of condensate (Kalinovac and Koprivnica) and localities were established with occurrences of gas accompanied by traces of petroleum (Kutnjak and Donja Bukovica).

* The article was compiled by Vilim Boranic, Vojtjeh Brajcic, Visnja Cmarec, Zlatko Hill, Ifet Ibrahimasic, Ante Lesic, Radmilo Protic, Mile Raduka and Damir Rajkovic. It was edited by Radmilo Protic.

Drilling done in the Pannonian Basin in 1978 totaled 90,159 meters. Seismic shooting was done in all depressions of the Pannonian Basin to prepare for exploratory drilling and to complete the regional network of profiles. The seismic profiles totaled 1,262.8 km. Gravimetric measurements were also made in the region of the northeastern slopes of Bilogora at about 2,600 points.

In the Mura Depression three wells were drilled, and one is still being sunk. At Dankovci two wells were completed at one drilling site: Dan-1 and Dan-1a. Abundant amounts of geothermal water were established at these wells. The locality of Pustakovec, i.e., the well Pus-1, yielded traces of hydrocarbons. Work is still being done at the locality Hodosan.

In the Drava Depression 25 wells were drilled at 16 localities, and 2 wells are still being sunk. At the locality Molve three wells were sunk; of these Molve-4 and Molve-6 revealed commercial amounts of gas, and they are still in the testing phase. At the well Molve-8 rocks with a lower saturation of gas were established, and the well Molve-7 is still being sunk. The maximum depth attained at the Molve locality is 5,005 meters; this is the Molve-4 well which was sunk. Wells at the locality Cvetkovac are not of interest from the standpoint of a commercial deposit of hydrocarbons. The locality Kutnjak, where the well Kut-2 was sunk, has become interesting because of an accumulation of gas with traces of petroleum. Localities such as Koprivnica, Stefkovica, Klokočevci, Donja Bukovica, Kalinovac, Obradovac, Leticani, Madarinci and Torjanski Rid are linked to established pools of hydrocarbons. The wells Lacic-1 and Lacic-1a and Marjanci-2 did not justify the expectations of prospectors. Nor did the well Crnac Zapad reveal rocks bearing hydrocarbons with favorable physical characteristics. Work is continuing at the locality Radosavci.

In the Sava Depression drilling was also more intensive in 1978. The deep well Lupoglav(p)-1 was drilled, and traces of petroleum were ascertained. At the locality Gospodjica traces of gas were established with the well Gos-3. At the locality Medjuric the well Me-2, which revealed geothermal water, was notable. Explorations are continuing in the Sava Depression at the locality Dubrava.

In the Slavonian-Srem Depression explorations in 1978 at the localities Cerna and Otok did not yield the expected results.

1.2. Offshore Prospecting of the Adriatic

Seismic and magnetometric measurements were made in this region. An interpretation was made of the seismic data. In the northwestern portion of the Adriatic 1,476.85 km of seismic and magnetometric profiles were taken. The platform Panon drilled a total of 6,529 meters during 1978. Drilling was also done from the platform Panon at the locations J-7/2 and J-18/1, where gas accumulations with commercial significance were found. A study program of exploration of Tertiary and Quaternary rock sediment as potential reservoir rock has been compiled for the Adriatic region.

1.3. Dinarids

Geological and geophysical work was done in the region of the Outer Dinarids. A depth of 5,763 meters was attained at the location Brac-1 thanks to continuation up to the end of 1978 of drilling begun in 1977. The stepout wells Brac-1a and Brac-2b were also drilled at this well. This drilling passed through sediments of limestones and limestone-dolomite breccias interstratified with clays. Two anhydrite complexes were established, separated from one another by a complex of bituminous limestone-dolomite breccias. Drilling has continued to the forecast depth at this location.

1.4. Reserve Development Work

In 1978 there was reservoir development activity at 64 wells; 29 of them were positive for petroleum, 5 positive for gas, and 2 were injection wells. Deposits of hydrocarbons were not found at 23 wells. However, directional drilling at 16 of these 23 wells revealed accumulations of hydrocarbons of commercial interest. Trials were run (by DST) to test the flow of fluid from the rocks and their saturation at 35 wells. Geophysical measurements were made at all wells, and at all reservoirs the geological structure, tectonic relations and petroleum-gas relations within reservoirs were studied and defined. Water-drive designs were prepared for the Zutica and Sandrovac reservoirs. Detailed studies were also made of reserves of deposits of hydrocarbons discovered previously. Of particular importance were the hydrodynamic measurements made at all deposits. The regime for pumping petroleum and gas from deposits in the process of exploitation was regulated. Interesting indicators were obtained by applying the pulse test in the Sandrovac, Lipovljani, Stefkovica, Jamarica, Benicanci and Bizovac fields. Programs were prepared for major repairs at about 100 wells, and about 430 programs were drafted for various engineering and technological undertakings and tests at 184 wells.

1.5. Operations Abroad

1.5.1. Gabon

With respect to explorations abroad in 1978, INA-Naftaplin, Naftagas, and the Preussag, Wintershall and DST firms concluded a contract with the government of the Republic of Gabon concerning exploration. INA-Naftaplin was designated operator. A geophysical survey was made of the region to be explored, and the data obtained were interpreted. Drilling at the first location in Gabon began in late 1978.

1.5.2. Italy

A contract was concluded between INA-Naftaplin and the SIR and AGIP companies of Milan for exploration of the northern portion of the Adriatic. Drilling is being done from the platform Panon, which is owned by INA-Naftaplin. Drilling has begun at the location Amanda-1, where a depth of 1,816

meters has been reached. At another location, Amanda-1 bis, a depth of 5,028 meters had been reached by the end of 1978. Drilling is continuing.

1.5.3. Syria

Drilling was halted in Syria during 1978, and the drilling rig was moved to Iraq.

1.5.4. Iraq

After work was completed in Syria, INA-Naftaplin concluded a contract with the Iraqi national company to drill four wells to a depth of 4,000 meters. At the first location drilling reached a depth of 3,433 meters in 1978.

1.5.5. Italy--Burmah Oil

A well was sunk to a depth of 600 meters for the English company Burmah Oil.

1.6. Results of Drilling by INA-Naftaplin

Tables 1 and 2 give the results of INA-Naftaplin's activity in 1978. Aside from what is given in the tables, we should especially emphasize the importance of directional drilling. This method of drilling was used in sinking 53 wells, where directional drilling totaled 52,392 meters. The "bush well" system was used at 20 wells. The greatest horizontal deviation was attained at three wells, and was between 700 and 800 meters, while the vertical deviation at two wells was 60°.

For a number of years now exceptional attention has been paid at INA-Naftaplin to development of so-called specialized mining techniques, which include:

- i. geophysical measurements in wells;
- ii. cementing work under various conditions;
- iii. well trials (DST);
- iv. consolidation work;
- v. work on the reservoir rocks, i.e., production-stimulation techniques to increase the yield of wells, etc.

Production-stimulation techniques such as chemical processing of the rocks and mechanical processing of the rocks (acidizing and fracturing) are taking on ever greater technical-and-economic significance in exploitation of petroleum and gas deposits. This is the principal reason why specialists at all INA-Naftaplin have gone through advanced training and why special laboratories have been equipped to study the physical properties of reservoir

rocks of petroleum and gas and of the so-called working fluids that are used. INA-Naftaplin accordingly has diverse specialized technical equipment and urgently needed methods of operation.

As the unexplored areas in which INA-Naftaplin is active decrease, more intensive drilling to ever greater depths has been undertaken. New unfavorable conditions resulting from high pressures and temperatures are therefore occurring. Tests in wells are becoming increasingly complex, and exploitation of fields necessitates elimination of technical difficulties as well as discovery of solutions which will make the process of pumping petroleum and gas more economically efficient.

Table 1. Drilling Activity of INA-Naftaplin

<u>Elements</u>	<u>1977</u>	<u>1978</u>
1. Total drilling in meters	181,781	197,731
a) Exploratory drilling for petroleum and gas	74,259	102,438
b) Stepout drilling for petroleum and gas	107,522	95,293
2. Number of wells sunk	98	115
a) Exploratory wells for petroleum and gas	34	51
b) Stepout wells for petroleum and gas	64	64
3. Success rate of drilling		
a) Total number of wells sunk	98	115
b) Positive for petroleum and gas	37	36
c) Dry (negative wells)	20	23
d) Wells being tested and new sites	41	56
4. Number of drilling rigs in operation	13.1	15.15
5. Meters drilled per rig	13,876	13,051

Table 2. Petroleum and Gas Production in INA-Naftaplin in 1978

<u>Elements</u>	<u>Output in 1977</u>	<u>Output in 1978</u>	<u>Index Number</u>
Petroleum, in tons	2,828,717	2,931,166	104
Gas, in thousands of cubic meters			
a) Natural gas	696,838	635,037	91
b) Casing-head gas	312,224	299,257	96
Total (a + b)	1,009,062	934,294	93
c) liquefied gas, in tons	51,553	53,844	104

Intensification of research work to overcome a number of natural difficulties (high temperatures, high pressures, presence of hydrogen sulfide, unfavorable physical properties of reservoir rocks, etc.) will be urgently necessary in order to resolve many engineering problems which pertain to various technological processes as well as problems arising out of the new conditions of exploration and exploitation of petroleum and gas fields as a whole. In view of the technical preparedness in all the specialized technological activities of INA-Naftaplin and also taking into account the numerous

engineers and other specialists and past work experience and achievements, these difficulties will be overcome in the near future.

Exploration, Drilling and Production of Petroleum and Gas by the Naftagas Work Organization in 1978

1.8. Petroleum and Gas Exploration

During 1978 exploration work was done mainly in Vojvodina and to a lesser extent in Serbia proper. In Vojvodina geophysical work was mainly detailed in nature, except for a portion of Srem and Macva, for serving as preparation for exploratory drilling. Several new structural elements of interest for actual exploration by drilling were defined or discovered.

In Backa, at the locality Bezdan-Sombor-Stara Moravica, five new structures of interest to actual exploratory drilling were defined. Detailed seismic tests to define new structures along the line Sid-Batrovci-Morovici were conducted in western Srem. Processing of the data is now under way.

In the region of Central Banat (in a broad area around Zrenjanin) detailed seismic tests were conducted and four new structural forms defined. Detailed seismic tests were also run in the region of southern Banat at the localities of Kupinik and Vatin and in a wide area around Zagajica. The results of these studies are still not known, since the data are still being processed.

In Vojvodina, aside from explorations for petroleum and gas, explorations were conducted to establish the hydrothermal potential and to ascertain possibilities for using geothermal water.

Exploratory drilling for petroleum and gas in Vojvodina was conducted at 37 wells, 5 of which are still being drilled. The following results were achieved in exploratory drilling:

- i. new gas deposits were discovered at Veliko Selo and Ilandza;
- ii. new petroleum deposits were discovered at Itebej and in shallower horizons at the Crna Bara well, and the petroleum reservoir Banatsko Karadjordjevo was broadened. Seven wells were drilled as part of the hydrogeological exploration, five of which yielded a positive result.

Detailed seismic studies were continued in Serbia proper over a fairly broad area of the Danube Valley--Pozarevac and Veliko Gradiste. The data are now being processed.

As part of the program for exploration of the Vranje Tertiary Basin, seismic studies have been conducted, and the first exploratory well has been sunk. In addition to that well, three other wells for petroleum and gas were sunk in Serbia proper.

Stepout Drilling

Stepout drilling was done at 28 wells, 3 of which are not finished. Of the 25 stepout wells which were finished, 3 were negative, and 1 was eliminated for technical reasons. The positive wells are still in the phase of testing are being prepared for exploitation.

Field development work was done at the following localities: Mokrin F, Mokrin zapad, Kikinda, Kikinda varos, Milosevo, Banatski Dvor, Velebit, Lokve, B. N. Selo, Boki and Srbobran.

1.8.1. Operations Abroad

In addition to the contracts previously concluded for exploration in Guinea and Gabon, negotiations were conducted during 1978 toward exploration in Tunisia and Algeria; it is expected that the work will be done during 1979.

1.8.2. Guinea

On the basis of a contract concluded in 1976 Naftagas undertook to explore for petroleum in the Republic of Guinea, assuming the obligation to finance 20 percent of the cost. Geological prospecting of the terrain was conducted during 1978 according to the work program, and seismic work was postponed until 1979.

1.8.3. Gabon

On the basis of a contract concluded with the government of the Republic of Gabon in 1977 Naftagas assumed the obligation to conduct exploration off the coast of the Republic of Gabon together with Naftaplin of Zagreb and three German firms. Naftagas' share in financing this work is 20 percent.

Seismic work was done in 1978, and the drilling of the first exploratory well has begun.

Table 3. Drilling Results

No	Elements	1977	1978	Index
1	Total drilling in meters	104,994	109,943	104.7
	a) Exploratory drilling for petroleum and gas	57,608	62,584	108.6
	b) Exploratory drilling for geothermal water	1,997	5,517	276.3
	c) Stepout drilling for petroleum and gas	45,389	41,842	92.2
2	Number of wells sunk	63	64	101.6
	a) Exploratory for petroleum and gas	30	32	106.6
	b) Exploratory for geothermal water	2	7	350.0
	c) Stepout for petroleum and gas	31	25	80.6

Table 3 (continued)

<u>No</u>	<u>Elements</u>	<u>1977</u>	<u>1978</u>	<u>Index</u>
3	Success rate of drilling	63	64	101.6
	a) Positive for petroleum and gas	27	30	101.1
	b) Positive for water	--	5	--
	c) Negative	21	19	90.5
	d) Being tested for petroleum and gas	13	9	69.2
	e) Being tested for water	2	1	50.0
4	Number of rigs in operation	8	8.8	110.0
5	Meters drilled per rig	13,124	12,279	93.6

1.10. Petroleum Production

Petroleum production in 1978 reached a volume of 1,140,833.6 tons, which is 2 percent more than the amount produced in 1977.

Table 4. Petroleum Production of Naftagas in 1977 and 1978

	<u>1977</u>	<u>1978</u>	<u>Index</u>
Petroleum production, in tons	1,118,420.5	1,140,833.6	102

Analysis of work at petroleum deposits showed that production fell short of the plan at all deposits except Kikinda varos C, Mokrin zapad, Coka and Palic.

1.11. Gas Production

Total gas production, which was 996,317,564 cubic meters, was 13 percent greater in 1978 than the amount produced in 1977. Actual production in standard cubic meters is given in Table 5.

Table 5. Gas Production of Naftagas

	<u>1977</u>	<u>1978</u>	<u>Index</u>
Natural gas	795,420,796	907,325,680	114.1
Casing-head gas	86,338,666	88,991,884	103.1
Total	881,759,462	996,317,564	113.0

Two new fields went on stream in Central Banat during 1978: Banatski Dvor and Srpska Crnja. However, results in gas production could have been even better if capital investment work on the main gas pipeline from Srpska Crnja to Kikinda had all been done on time.

1.12. Drilling Activity in Yugoslavia as a Whole

The principal characteristic of the results achieved in drilling, as in the previous 2 years, was the considerable increase in exploratory drilling (Table 6). In 1978 a total of 170,539 meters of exploratory drilling was done in Yugoslavia, which is 27 percent more than in 1977. The increase of exploratory drilling was 9 percent for Naftagas and all of 38 percent for INA-Naftaplin. This is the principal reason for the 7-percent increase in total meters drilled, since production drilling is in a considerable decline.

Intensification of exploratory drilling on the one hand brought about an increase in the number of exploratory wells, which was all of 41 percent (even 50 percent in Naftaplin), while on the other hand there was a drop in the output per rig because exploratory drilling was done at considerably greater depths where the conditions are also considerably less favorable (high pressures and temperatures, greater hardness of the rocks being drilled, etc.).

Table 6. Results of Drilling Activity in Yugoslavia in 1978

<u>Drilling Results</u>	<u>1977</u>	<u>1978</u>	<u>Index 78/77</u>
INA-Naftaplin			
1. Total drilling done, in meters	181,781	197,731	109
a) Exploratory drilling	74,259	102,438	138
b) Production drilling	107,522	95,293	89
2. Number of wells completed	98	115	117
a) Exploratory	34	51	150
b) Production	64	64	100
3. Number of rigs in operation	13.1	15.15	116
4. Number of meters drilled per rig	13,876	13,051	94
Naftagas			
1. Total drilling done, in meters	104,994*	109,943*	105
a) Exploratory drilling	59,605	68,101	114
b) Production drilling	45,389	41,842	92
2. Number of wells completed	63	64	102
a) Exploratory	32*	39*	122
b) Production	31	25	81
3. Number of rigs in operation	8	8.8	110
4. Number of meters drilled per rig	13,124	12,279	94
Total			
1. Total drilling done, in meters	286,775	307,674	107
a) Exploratory drilling	133,864	170,539	127
b) Production drilling	152,911	137,135	90

Table 6 (continued)

<u>Drilling Results</u>	<u>1977</u>	<u>1978</u>	<u>Index 78/77</u>
2. Number of wells completed	159	179	113
a) Exploratory	64	90	141
b) Production	95	89	94
3. Number of rigs in operation	21.1	23.95	114
4. Number of meters drilled per rig	13,497	12,847	95

* Exploratory drilling for geothermal water was included among exploratory wells; this amounts to 1,977 meters (two wells) in 1977 and 5,517 meters (seven wells) in 1978.

1.13. Petroleum and Gas Production in Yugoslavia

Petroleum production was 4,076,000 tons in 1978, which is 3 percent more than in the previous year. This increase was mainly achieved at existing petroleum fields through better regulation of the drilling regime and better use of available pumping time. Since several water-drive designs have been prepared or are in preparation at certain petroleum fields, and since ever greater attention is being paid to specialized mining techniques and production-stimulation techniques to increase the yield of wells (chemical and mechanical treatment of the rocks), there can be confidence that production will increase even more in the coming period.

The increase in the production of natural gas was a total of 2 percent in 1978; this is thanks to production at Naftagas, where its total production rose 12 percent over 1977 thanks to existing production and two new fields which were put on stream.

Gas production in INA-Naftapiin dropped 7 percent, by contrast with previous years.

Table 7. Petroleum and Gas Production in Yugoslavia in 1978

<u>Petroleum Production (10³ tons)</u>	<u>1977</u>	<u>1978</u>	<u>Index 78/77</u>
INA-Naftapiin	2,829	2,931	104
Naftagas	1,118	1,140	102
INA-Nafta, Lendava	<u>5</u>	<u>5</u>	<u>100</u>
Total	3,952	4,076	103

Table 7 (continued)

<u>Production of Natural Gas (millions of m³)</u>	<u>1977</u>	<u>1978</u>	<u>Index 78/77</u>
INA-Naftaplin	1,009	934	93
Naftagas	888	996	112
INA-Nafta, Lendava	--	--	--
Total	1,897	1,930	102

2. Petroleum Refining

In all 14.2 million tons of petroleum were refined in 1978, which is 3 percent more than in the previous year, when 13.8 million tons of petroleum were refined. This means that 400,000 tons more petroleum was refined in 1978 than in 1977.

The relations between domestic and imported petroleum and the amounts refined are indicated in Table 8.

Table 8. Petroleum Refining in Yugoslavia

<u>Year</u>	<u>Domestic Petroleum</u>		<u>Imported Petroleum</u>		<u>Total</u>	
	<u>10³ t</u>	<u>%</u>	<u>10³ t</u>	<u>%</u>	<u>10³ t</u>	<u>%</u>
1977	3,868	28.0	9,967	72.0	13,835	100.0
1978	3,983	28.0	10,245	72.0	14,228	100.0
Index	103.0	--	102.8	--	102.9	--

As we see from Table 8, the amount of domestic petroleum refined increased from 3,868,000 tons in 1977 to 3,983,000 tons in 1978, or an increase of 115,000 tons, or 3.0 percent. Yet this increase was 56,000 tons greater than in 1977, when the growth was 59,000 tons. On the other hand, 10.2 million tons of imported petroleum were refined in 1978, which is 278,000 tons more than in the previous year. The index number was 102.8. The share of domestic petroleum in total refining was the same in 1977 and in 1978, i.e., 28.0 percent, and therefore the share of imported petroleum was the same, or 72 percent: 71.5 percent and 72.4 percent, respectively. Domestic petroleum was refined by refineries with favorable location relative to the petroleum fields, while imported petroleum was distributed according to the agreement among the refineries.

The refineries endeavored to refine all available domestic petroleum, and the country's need for petroleum products was the factor regulating the amount of petroleum imported. But difficulties in timely importation of petroleum, which occurred for financial reasons and because of late arrival at refineries, were a limiting factor. It was not always possible to store refinery yields to meet seasonal needs of the market for liquid fuels,

finished petroleum products had to be imported from time to time as an intervention measure.

Refinery capacity available because of the occasional shortage of imported petroleum could not be fully utilized, and utilization averaged 79 percent.

Table 9 shows the production of the principal products, which, as in the past, found its level as a function of the peculiarities of the petroleum being refined, of the availability of processing facilities for refining and finishing the primary products of petroleum refining, and of the needs of the market, whose makeup fluctuated considerably in the winter and summer months. The table gives separately the internal consumption of the refineries, which in 1978 was 865,000 tons, or 5.96 percent, for all the refineries taken together. In 1977 this consumption was 868,000 tons, or 6.3 percent. In 1978 the loss in processing was 281,000 tons, as against 212,000 tons in the previous year. Relative to the petroleum refined, the loss in processing was 1.94 percent in 1978 and 1.53 percent in 1977.

Table 9. Yields of Petroleum Refining in Yugoslavia

Product	1977*		1978**	
	10 ³ t	%	10 ³ t	%
Motor gasoline	2,190	15.8	2,301	15.9
Jet fuel and kerosene	330	2.4	299	2.1
Diesel fuel, household heating oil and extra-light heating oil	4,147	29.9	4,268	29.4
Heating oil	4,559	32.9	4,638	32.0
Asphalt	537	3.9	635	4.4
Other products	1,012	7.3	1,213	8.3
Total	12,775	92.2	13,354	92.1
Internal consumption of refineries	868	6.3	865	6.0
Losses in processing	212	1.5	281	1.9
Petroleum refined and additives	13,855	100.0	14,500	100.0

* The data for 1977 as given in NAFTA, Vol 6, No 29, 1978, p 293, Table 11, were revised by subsequent estimates--the adjusted figures are given in the table above.

** Preliminary figures.

As we see from Table 9, total production of petroleum products (not including internal consumption) increased from 12.8 million tons in 1977 to 13.4 million tons in 1978, an increase of 579,000 tons, or 4.5 percent.

Moreover, the yields of the various product groups did not essentially change between 1977 and 1978.

Production of motor gasoline was 2,301,000 tons in 1978, as against 2,190,000 tons in 1977, an increase of 111,000 tons, or 5.1 percent. The share in the petroleum refined was 15.9 percent in 1978, as against 15.8 percent in 1977.

The production of jet fuel and kerosene was 31 percent less in 1978; that is, in 1977 it was 330,000 tons, and in 1978 it was 299,000 tons, and its share in the total dropped from 2.4 percent to 2.1 percent.

The product group consisting of what are called intermediate distillates, i.e., diesel fuel, household heating oil and extra-light heating oil, had an output of nearly 4.3 million tons in 1978, as against 4.15 million tons in 1977, so that there was an increase of 121,000 tons. However, since the increase was 2.9 percent, the share of this group relative to the petroleum refined decreased from 29.9 percent to 29.4 percent. The increase in production was based on consumer demand.

The production of residual heating oil increased--aside from internal consumption, which was almost the same in both years--by only 79,000 tons, i.e., from 4,559,000 tons in 1977 to 4,638,000 tons in 1978. However, the share relative to petroleum refined dropped from 32.9 percent to 32.0 percent, since the growth was only 1.7 percent.

A sizable increase in production occurred in the group referred to as "other products," which consists of primary and special gasolines, white spirit, lubricating oils and greases, paraffin and petroleum coke. Production of these products in 1978 was slightly over 1.2 million tons, as against approximately 1.0 million tons in the previous year. For that reason the share increased from 7.3 percent to 8.3 percent. The increase consisted largely of primary gasoline.

Table 10 gives the production figures and proportions for the three principal groups of products: a) motor gasoline and primary gasoline, b) intermediate distillates, i.e., jet fuel, kerosene, diesel fuel, household heating oil and extra-light heating oil, and c) residual products--heating oil (together with internal consumption) and asphalt, petroleum coke being ignored.

Table 10. Proportions of the Principal Products of Petroleum Refining

Product Group	1977		1978		Index
	10 ³ t	%	10 ³ t	%	
Total production	13,643	100.0	14,219	100.0	113.7
Breakdown:					
a) Motor and primary gasolines	2,618	19.2	2,848	20.0	108.8
b) Intermediate distillates	4,147	30.4	4,567	31.5	110.1
c) Residual products	5,964	43.7	6,138	42.4	102.9

As we can conclude from Table 10, these three groups of products constitute nearly 94 percent of total production. The largest growth of production

relation to 1977 was for the group of intermediate distillates (10.1 percent) and the smallest for the residual products (2.9 percent). The share of the gasoline fraction was slightly smaller in 1977 than in 1978 (19.2 percent, as against 20.0 percent), the share of intermediate distillates increased from 30.4 percent to 31.5 percent, and the share of residual products dropped (from 43.7 percent to 42.4 percent).

In addition to the factors affecting refinery yields we have already mentioned, it is possible that the differing growth rates were also affected by a change in the quality of the petroleum refined.

During 1978 the refineries made considerable efforts as part of their permanent task of maintaining the high quality of their products already achieved; in so doing they paid attention to the ever stricter requirements of consumers, and they also endeavored in their operation to reduce pollution of the air, streams and the sea to the greatest possible degree.

The Energoinvest refinery in Bosanski Brod completed all the organizational and financial preparations for construction of new facilities, and work on the site will soon begin; the same is the case with the construction of new facilities at the refinery in Modrica. There are plans for construction of primary and vacuum distillation units, a catalytic reforming unit, and the accompanying processes for hydrodesulfurization of light and intermediate distillates and finishing of asphalt. Deasphaltization with propane will be used to prepare the base heavy oil for the refinery at Modrica. Following construction of all the processing facilities the refinery at Bosanski Brod will be able to refine 5.0 million tons of petroleum annually.

The INA refinery at Lendava has undertaken to build a primary petroleum distillation facility with a capacity of 2.0 million tons per year, a catalytic reforming unit and a unit for desulfurization of intermediate distillates.

The Naftagas refinery in Novi Sad increased its capacity for primary petroleum refining back in 1977 to 1.4 million tons per year, and an installation for refining and finalizing oil distillates is now under construction. Organizational and technical preparations are being made for construction of a primary distillation unit (2.0 million tons per year), a catalytic reforming unit, and an installation to increase the assortment of lubricating oil.

In late 1978 the Naftagas refinery in Pancevo put on stream a new atmospheric distillation unit with a capacity of 3.5 million tons per year, so that even at present it can annually refine 5.5 million tons of petroleum. An enlargement is under way; that is, corresponding new secondary processes are being built.

Preparatory work is being done to build a synthetic rubber factory in Zrenjanin.

The INA refineries at Rijeka and Sisak reached petroleum refining capacities of 8.0 million tons per year and 7.5 million tons per year, respectively, in previous years, and during 1978 construction of new secondary refining processes was undertaken. At Rijeka these include a catalytic cracking unit, and at Sisak a catalytic cracking unit, an aromatic extraction unit, and a synthetic rubber factory, along with a corresponding enlargement of previous finishing capacities.

3. The Yugoslav Market and Consumption of Petroleum Derivatives and Gas in 1978

The demand for petroleum derivatives on the Yugoslav market last year was greater than supply, especially in the last quarter, which logically brought about occasional shortages of stocks and an understandable nervousness on the market.

In addition to the shortage of heavy fuel oil, which was well known even in the past, in 1978 there was an exceptional growth in the consumption of diesel fuel resulting from weather conditions, which certainly (and to some extent even unpredictably) deteriorated the already difficult situation in supplying the market, especially in the winter months.

The principal reason for this bad situation (it was certainly the worst in the last several years since the 1973 oil crisis) lies in the tardy importation of the additional amount of petroleum, which could not be refined on time and delivered to the point of consumption. In addition to the articles we have mentioned (heavy fuel oil and gas oils), motor gasolines, jet fuel, white spirit, and liquefied gas were also in short supply on the market in 1978.

In 1978 there was a major adjustment of the prices of petroleum derivatives on the Yugoslav market, which obviously did not have any major impact on demand. First, on 28 July 1978 gasoline prices went up 5 percent, and then on 26 November they went up another 25 percent, for a total of 31 percent. Diesel fuel went up 16 percent in the first round and then another 38 percent, for a total of 61 percent. There was also a considerable price rise of 36 percent on extra-light heating oil and 46 percent on heavy fuel oil.

However, the price rises still came too late to have any substantial impact on the demand for derivatives last year.

Moreover, even this rise of prices should be examined in the light of the existing inflation, which again in 1978 was about 14 percent, and in the light of the rise of personal income, whose increase was even greater and amounted to 20 percent more than in 1977.

Inflation, which in the period from April 1974 to the end of 1978 amounted to 109 percent according to official data (Federal Bureau of Statistics in Belgrade), while the rise of personal income was 127 percent over the same

period, brought the new prices of gasoline and other derivatives to the level before the 1973/74 oil crisis, which was felt on the side of consumption as well.

Average consumption per vehicle has in recent years been close to consumption reported before the oil crisis, when it was 929 kg (1973), dropping to about 800 kg in 1974. In 1976 and 1977 it was about 870 kg, and only last year did it rise slightly to 889 kg. The number of passenger cars on the road increased considerably once again in 1978. Passenger car production in 1978 amounted to 254,000 vehicles. Imports were 57,000, and exports were 24,000.

According to preliminary data of the Federal Bureau of Statistics, 2,142,521 passenger cars were registered in 1978, which is 11 percent more than a year earlier, when 1,923,904 automobiles were registered.

In 1978 14.8 million foreign vehicles crossed the border, which is an increase of 15 percent over the 12.9 million which crossed the border a year earlier. Foreign tourists are probably a particularly important factor here; in 1978 their number increased considerably from 5,621,000 to 6,385,000, or 14 percent. There was a still greater increase (20 percent) in the number of nights spent in lodgings, from the 29 million recorded in 1977 to nearly 35 million in 1978. This brought about a considerably greater consumption of gasoline by foreign tourists, which according to certain estimates exceeded the figure of 220,000 tons. If we include local border traffic, border traffic and transit, total sales to foreign nationals are estimated at more than 450,000 tons, or 19 percent of total gasoline sales on the Yugoslav market.

In 1978 a total of 2,335,000 tons of motor gasoline were sold, as against 2,129,000 tons in 1977, or an increase of 10 percent.

In 1978 the number of trucks increased by 21,000 manufactured in Yugoslav factories and another 2,366 imported. According to preliminary figures of the Federal Bureau of Statistics, the total number of trucks and buses registered at the end of 1978 was 194,160, as against 179,815 a year earlier. The increase is 8 percent. The number of trailers by and large stayed at the same level of about 80,000.

The number of tractors increased from 255,851 in 1977 to 296,825 in 1978, or an increase of 16 percent. The very unfavorable weather conditions in agriculture, aside from this increase in the number of vehicles, had a considerable impact in increasing consumption of diesel fuel in agriculture, especially toward the end of last year.

The activity of public highway carriers in 1978 showed a 4-percent increase in passenger transportation over a year earlier. Whereas 878 million passengers were carried in 1977, 914 million were carried in 1978. The volume of trucking in 1978 was 14.1 billion ton-kilometers, which is 13 percent more than in 1977, when traffic amounted to 12.5 billion ton-kilometers.

Diesel fuel sales in 1977 ranged within this framework, rising 7 percent. Consumption was 2,674,000 tons, as against 2,511,000 tons in 1977. More household heating oil was consumed because last winter was more severe than the previous ones, so that the total increase in consumption of gas oils was all of 19 percent. A total of 4,421,000 tons of gas oils were consumed, as against 3,902,000 tons recorded in 1977.

Consumption of heavy fuel oil rose 10 percent, but it is certain that the amounts available to the market did not meet the real demand. Total consumption was 6,385,000 tons, as against 5,827,000 tons in 1977. If internal refinery consumption is excluded, heavy fuel oil consumption was 5,750,000 tons, as against 5,175,000 tons in 1977, which is an increase of 11 percent.

More asphalt was also consumed in 1978 than in the previous year. A total of 641,000 tons were consumed, as against 571,000 tons in 1977, for an increase of 16 percent.

Motor oil sales amounted to 104,000 tons, or an increase of 3 percent. The ratio of motor oils to motor gasoline and diesel fuel is continuing to drop, but the reduction was only 1.9 percent. This is the first time that this percentage has dropped below 2, which brought it closer to the customary figures (between 1.7 and 1.9 percent) for the advanced countries.

Consumption of industrial oils and greases was 124,000 tons, or an increase of 6 percent.

Jet fuel sales rose 2 percent, from 327,000 tons to 332,000 tons, mainly thanks to increased domestic traffic. The unfavorable prices, and also the shortage of this article, had a considerable impact on consumption of the foreign airlines.

The shortage of liquefied gas on the domestic market was felt particularly in the winter months of 1978. Nevertheless, sales increased from 347,000 tons to 405,000 tons, or a rise of 17 percent.

In 1978 the Yugoslav market consumed a total of 15,183,000 tons of derivatives, as against 13,572,000 tons in 1977, or an increase of 12 percent, which is certainly the highest growth rate since the years before the petroleum and energy crisis in 1973.

There were no essential changes in the pattern of consumption. Fuel oil had the highest share at 42 percent, which is slightly less than in 1977, when heavy fuel oil accounted for 43 percent of consumption. The restrictive measures certainly had an impact here, but so did the shortage of this article on the domestic market. This share is still higher than the yield of the Yugoslav refineries, which in recent years has been about 32 percent. The difference is made up with imports.

The share of gas oils remained at the same level of 29 percent, while the share of gasoline dropped from 16 to 14 percent.

Table 11. Sales of Derivatives on the Yugoslav Market in 1977 and 1978

Article	Sales, in thousands of tons		Increase or Reduction, %		Composition of Sales	
	1978*	1977*	78/77	77/76	1978	1977
1. Primary gasoline	134	65	106	-4.4	0.9	0.5
2. Motor gasoline	2,339	2,145	9	10.9	15.4	15.8
98 octane alone	1,748	1,530	14	14.7	11.5	11.3
86 octane alone	591	615	-4	1.9	3.9	4.5
3. Special gasoline	67	62	8	-27.1	6.4	0.5
4. White spirit	35	32	9	-4.0	0.2	0.2
5. Kerosene and jet fuel	332	327	2	-3.5	2.2	2.4
6. Gas oils	4,421	3,902	13	9.3	29.1	28.8
Diesel fuel alone	2,674	2,511	6	11.1	17.6	18.5
7. Fuel oil	6,385	5,827	10	9.4	42.1	42.9
Internal consumption alone	635	634	0	7.1	4.2	4.7
8. Motor oils	104	101	3	9.8	0.7	0.7
9. Industrial oils and greases	124	117	6	5.4	0.8	0.9
10. Asphalts	651	571	14	29.3	4.3	4.2
11. Other derivatives	214	76	143	40.9	1.2	0.6
12. Liquefied gas	421	347	17	20.5	2.7	2.6
	15,183	13,572	12	10.0	100.0	100.0

* The figures for 1977 have been revised and do not agree with the figures published in NAFTA, Vol 29, No 6, 1978, p 295--the figures for 1978 are preliminary.

Source: The sales figures were supplied by members of the Nafta Trade Association in Zagreb and the Petrolunion Trade Association in Belgrade.

Notes: 1. Includes internal refinery consumption and tank supply to ships and aircraft
2. Motor gasolines also include aviation gasoline.
3. The group "gas oils" includes not only diesel fuel, but also extra-light household heating oil and special heating oil for industry.
4. The "heating oil" group includes light, medium and heavy heating oil.
5. The group "other derivatives" includes aromatics, petroleum coke, etc.

As for gasolines, we should mention that the share of regular is continuing to drop, so that in 1978 its share was only 25 percent, as against 28 percent a year earlier. It is obvious that the Yugoslav market wants gasoline with a higher octane number and that our refineries are already lagging considerably behind in this respect.

The share of other products by and large remained unchanged.

Of total consumption of petroleum derivatives on the Yugoslav market, energy consumption accounted for 1,432,000 tons. Nonenergy consumption was 1.71 million tons, or 10.4 percent of total consumption.

Consumption of natural gas on the Yugoslav market was limited by domestic production, which in 1978 was 1,975 million cubic meters.

Compared to 1977, when consumption was 1,897 million cubic meters, last year's consumption was up 2 percent.

Transport, Storage and Handling of Petroleum, Derivatives and Gas

With the increase in the production, refining and sales of petroleum, derivatives and gas between 1977 and 1978, it is normal that there should also have been an increase in the volume of transport, storage and handling, which linked together all the activities in the petroleum and gas industry into a single chain of supply to consumers on the market.

Since consumption rose more rapidly than domestic energy production in both relative and absolute terms, imports from distant and overseas countries have had an ever greater proportion, and therefore the volume of transport, storage and handling services has also increased at a relatively faster rate.

In 1978 petroleum imports amounted to about 2 million tons more than in the previous year, mainly arriving by sea and passing through the terminals at Kopar, Rijeka, Zadar, Solin, and Ploce.

Again this year there were no problems in providing necessary tanker capacity for transporting crude petroleum because of the well-known situation on the tanker space market resulting from the surplus of available capacity either built or ordered during prosperous times, before 1973 and 1974.

That is, the world tanker fleet, which at the outset of 1978 represented a deadweight tonnage of 332.5 million, is still holding sizable capacities in mothballs because it cannot find employment for them, which is naturally affecting the supply and demand and thereby the level of shipping rates, which did not change essentially in 1978; to support this assertion we give figures on shipping rates at the end of 1977 and 1978 according to the customary system of AFRA (Average Freight Rate Assessment) indices.

Table 12. Survey of Indices of Average Shipping Rates Paid at the End of 1977 and 1978

No	Tanker Category With Respect to Carrying Capacity	Capacity, in deadweight tons	<u>Shipping Rate Indices</u>	
			<u>16 Nov- 15 Dec 77</u>	<u>16 Nov- 15 Dec 78</u>
1	General purpose	16,000- 24,999	WS 151.2	WS 209.3
2	Medium range	25,000- 44,999	WS 106.2	WS 166.3
3	Large range 1	45,000- 79,999	WS 66.1	WS 117.3
4	Large range 2	80,000-159,999	WS 50.9	WS 72.6
5	VLCC	160,000-319,999	WS 44.0	WS 47.4

The situation on the tanker space market was compounded even more by the fact that according to the figures for mid-1978 another 142 tankers are under construction with a total carrying capacity of 13.3 million tons, and construction of 91 tankers with a total tonnage of 6.3 million tons is scheduled, but not yet begun. Efforts to employ the fleet as floating storage have not yielded particularly good results, since there is a lack of sufficiently suitable moorings, and insurance costs are much higher than for conventional storage installations on the land. Nor was the recommendation of IMCO (Intergovernmental Maritime Consultative Organization) that all tankers over 70,000 deadweight tons ordered after 1975 and delivered after 1979 have their own ballast water system (which would also affect the size of available capacity) adopted, since this would have increased capital outlays by between 16 and 30 percent, which, the shippers say, is not acceptable in a time of extremely low shipping rates, though it is necessary in order to protect the environment and reduce pollution of the sea.

In expectation of better times or of a better scrapyard price for tankers, or waiting for someone else to scrap his tankers, many shipowners have for quite a long time been keeping sizable capacities in mothballs. On the other hand many countries, that is, their governments and other responsible institutions, are aiding shipping companies and shipbuilders, all of which, taken together, makes the situation entangled and extremely uncertain. Nevertheless, the prolonged crisis and unemployment of a rather large portion of capacity are forcing many shipping lines further and further into an unenviable economic situation, compelling them to scrap a portion of their fleet. For instance, even tankers exceeding 200,000 deadweight tons built between 1964 and 1965 according to a technology which was less up-to-date than at present, are already being sent to the scrapyards.

Another interesting new feature related to maritime transportation is tying petroleum sales to the purchase of certain amounts of petroleum derivatives produced in the refineries of producing countries in the Middle and Near East. This is the beginning of a trend which was heralded earlier; it certainly could have far-reaching consequences for development of the petroleum industry in the consuming countries, and it should be followed with due attention.

Table 13. Survey of Ships Scrapped in Millions of Deadweight Tons

	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	1978 (first quarter)
Tankers	1.4	8.6	10.15	8.65	4.30
Combined vessels	--	0.1	0.40	0.80	0.40
Bulk carriers	--	--	--	0.70	0.72
Vessels for general cargo	3.4	2.1	2.40	0.97	0.68
Other purposes	--	--	--	<u>0.23</u>	<u>0.12</u>
Total	4.8	10.8	12.95	11.35	6.22
Average age of the ships scrapped, in years	25	19	18	18	17

In view of our geographical position and the expected opening of the Yugoslav pipeline, we are interested in the new element introduced by Egypt in its effort to increase the transit of petroleum through the SUMED oil pipeline. The innovation is that the transit rate would be reduced from \$1.60 to \$1.52 per ton for every carrier who annually carries more than 1 million tons, and if transit exceeds 14 million tons a year, the transit rate would drop to only \$1 per ton. There have been minor problems in maritime transport of crude petroleum to meet Yugoslavia's needs in 1978 because of the unsynchronized arrival of tankers at terminals, and demurrage had to be paid. There were also certain problems in the transport of imported petroleum by rail from the terminal on the coast to refineries in the interior, especially when imported petroleum reached Solin and Zadar simultaneously, since after Knin they are connected to the petroleum refinery at Sisak by the same rail line.

The transport of domestic crude petroleum from the producing fields in Vojvodina, Slavonia, and the Sava and Drava valleys was accompanied by considerable difficulties for several reasons. In the summer and fall of 1978 there was low water for a rather long period of time, which affected the rate of arrival of petroleum to refineries from the fields in Vojvodina and Slavonia. Since imports of the necessary amounts of petroleum for the Yugoslav market were late, there were disruptions in refining and supply of the market. That is, because capacity in the distribution sphere is still relatively small, because of the irregular arrival of the imported petroleum needed and petroleum from domestic fields at the end of the year, when consumption is greatest, and transport capacity is reduced because of snow, ice, fog, low water, and the like, the situation on the market was fairly critical and fraught with difficulties, which had to be dealt with by extraordinary efforts and measures.

The railroad, which is the most reliable means of land transportation after the pipeline, is still not able to meet the demand, particularly that of the petroleum industry. The rolling stock owned by the Yugoslav Railroad is

small and outdated. Foreign tank cars were rented on a large scale (the estimate is 5,000 rail tank cars in 1978), and great difficulties arose in 1978 out of the limited traffic capacity and load capacity of certain lines, especially the Rijeka line, which is the route to the market for certain amounts of the necessary derivatives from the largest Yugoslav refinery, the Rijeka Petroleum Refinery.

We can therefore regard as a very significant event in 1978 the agreement reached and the self-management accord being prepared to solve the "tank car problem." That is, the trade association of Yugoslav producers (Djuro Djakovic, MIN, Vasa Miskin, Gosa, Rade Koncar, TAM, and others) have assumed obligations in an agreement to produce a sufficient number of tank cars in coming years to meet the needs of the Yugoslav economy, and moreover they will extend credit with a repayment period of 7 years to cover half the value of each tank car. The tank cars would be ordered from the manufacturers by the Yugoslav Railroad, that is, railroad transportation enterprises, which would also provide credit to cover the other half of the value of each tank car. Under this agreement the users would have to assume the obligation of renting foreign tank cars and return the same to the owners within a period of 5 years. The domestic producers also guarantee a service life of at least 15 years for the tank cars.

In view of the foreign exchange paid to rent the foreign tank cars, which is estimated at 270 million dinars annually, this proposed agreement deserves full attention on the part of all those concerned: the producers, the Yugoslav Railroad, and the petroleum industry, and indeed our entire community. In 1978 work proceeded on the Yugoslav oil pipeline along its entire extent. The terminal at Omislje was completed, the island of Krk has been passed, the Hungarian border has been reached, but the planned pace of the work as a whole was not met, so that it is now estimated that the pipeline will be opened in the second half of 1979. The actual construction cost will be 60 percent greater than was previously foreseen (in all it will cost about 11 billion dinars), and the principal reasons given are these:

- i. the change in the rate of exchange,
- ii. the rise in import duties, bank commissions and other charges,
- iii. substantial differences between the engineering and technological solutions envisaged in the plan of the project and those adopted in the design being used in execution.

In spite of all the difficulties that are accompanying its construction, the oil pipeline is coming to an end. With its completion the Yugoslav petroleum industry will have a magnificent facility which will profoundly alter the pattern of transport of crude petroleum in the best possible way.

With respect to the country's gasification in 1978, it is particularly significant that natural gas from the USSR was imported for the first time in the country's history.

On 1 December 1977 a pipe with a diameter of 50 cm crossed the Mura River in the western part of the country, over the Austrian-Yugoslav border.

According to the predictions, the importation of natural gas was to begin in Yugoslavia on 1 July 1978, but because of delays in work to build the gas pipeline system, importation began in November, and on that occasion ceremonies were held at Vodice near Ljubljana. The ceremonies were organized by the importers of Soviet gas--Petrol, INA-Naftaplin and Gas, which is a subsidiary of Naftagas--and they were attended by representatives of the Federal Executive Council, the USSR minister for the gas industry, and representatives of Czechoslovakia, Austria and Italy.

The main gas pipeline from Horgosz to Senta, which is 37 km, was completed in September. Thus the gas pipeline network in the eastern part of the country was connected to Hungary, which in the eastern part of the country created the technical conditions for importation of gas from the USSR. In 1978 work was also completed on the main gas pipeline on the route Mokrin-Senta-Gospodjinci-Batajnica-Pancevo, which is 215 km long. Now that the branch pipelines to supply consumers in Vojvodina have been readied for operation, the basic "artery" has been completed over a length of more than 400 km. Since an agreement has been concluded with consumers in Bosnia-Hercegovina concerning gas supply for a 20-year period, the preconditions were also created for building a gas pipeline to Sarajevo, which immediately began with construction of the crossing over the Sava at Ostruznica, the crossing over the Drina at Zvornik, and so on. The work in the direction of Serbia proper is behind schedule. So that construction could be continued, especially in the direction of Belgrade, a beginning was made to conclude an agreement with gas consumers concerning long-term consumption in that area.

Significant results were also achieved in 1978 in the purchase and construction of new transportation and storage facilities, but still none of this is at the level of the need, which is increasing at a relatively fast rate. This especially applies to storage capacity in the distribution sphere in the vicinity of the large centers of consumption, which is insufficient for inventories to offset seasonal fluctuations in consumption.

Because of the unequal rise of prices, not only were the existing price disparities not corrected, but new ones were even created: for example, the refinery price of 86-octane motor gasoline is separated by only an eyelash from that of D-2 diesel fuel (2,695:2,673), which is an absurdity not to be found, as far as we know, anywhere else in the world. This price change was inaugurated by the Law on Amendments and Supplements to the Law on Taxation of Sales of Products and Services and the Order on Maximum Prices of Petroleum Derivatives. The effect of the price changes on the most important petroleum derivatives is shown in Table 14.

(The effects of the increase are shown in terms of the units of measurement used most frequently, per liter in the case of motor fuels and per kilogram in the case of heavy fuel oil.)

Table 14. Effects of Price Increases

<u>Price Elements</u>	<u>86-Octane Motor Gasoline</u>	<u>98-Octane Motor Gasoline</u>	<u>D-2 Diesel Fuel</u>	<u>House- hold Heating Oil</u>	<u>Heavy Fuel Oil</u>
Refinery price	0.08	0.08	0.15	0.15	0.144
Trade markup	<u>0.10</u>	<u>0.10</u>	<u>0.03</u>	<u>0.03</u>	<u>0.008</u>
Petroleum industry as a whole	0.18	0.18	0.18	0.18	0.152
Highway use fee	0.40	0.40	0.60	--	--
Turnover tax	<u>1.37</u>	<u>1.27</u>	<u>1.12</u>	<u>0.82</u>	<u>0.298</u>
Grand total	1.95	1.85	1.90	1.00	0.450
Breakdown, %:					
Refinery price	4.1	4.3	7.9	15.0	32.0
Trade markup	<u>5.1</u>	<u>5.4</u>	<u>1.6</u>	<u>3.0</u>	<u>1.8</u>
Petroleum industry as a whole	9.2	9.7	9.5	18.0	33.8
Highway use fee	20.5	21.6	31.6	--	--
Turnover tax	<u>70.3</u>	<u>68.7</u>	<u>58.9</u>	<u>82.0</u>	<u>66.2</u>
Noneconomic activities as a whole	<u>90.8</u>	<u>90.3</u>	<u>90.5</u>	<u>82.0</u>	<u>66.2</u>
Grand total	100.0	100.0	100.0	100.0	100.0

As we might conclude on the basis of the figures given in the table, the basic feature of this price change is the increase to the benefit of the treasury, not to the benefit of the petroleum industry.

Another significant feature of the price changes which we have mentioned is the creation of a new disparity in producer prices. The prices have become "squeezed," so that the differences between prices of particular derivatives are as a rule minimal, and in some exceptional cases they are even absurd. Thus the producer's price of liquefied gas is appreciably below the price of crude, and the producer's price of petroleum coke is even slightly less than two-thirds of the purchase price of crude.

In calculating the parity between refinery prices and the purchase price of crude we use the average price of crude petroleum purchased fob the refineries, which is the result of calculations, but also in part of an estimate; according to our data, it is about \$110 per ton, or about 2,085 dinars per ton.

Table 15. Relation Between Refinery Prices of Derivatives and the Purchase Price of Crude Petroleum, in dinars per ton

<u>Product</u>	<u>Refinery Price</u>	<u>% of Price of Crude</u>
98-octane motor gasoline	3,846	+84.46
86-octane motor gasoline	3,637	+74.44
D-1 diesel fuel	3,344	+60.38
D-2 diesel fuel	3,186	+52.81
Household heating oil	3,144	+50.79
Special light heating oil	3,128	+50.02
D-3 diesel fuel	3,100	+48.68
Jet fuel	2,270	+ 8.87
Primary gasoline	2,201	+ 5.56
40/200 asphalt	2,098	+ 0.62
Liquefied gas	1,848	-11.37
Light heating oil	1,706	-18.18
Medium fuel oil	1,544	-25.95
Green petroleum coke	1,346	-35.44
Heavy fuel oil	1,254	-39.86

(As is customary, the refinery prices include costs of shipping motor fuels and household heating oils to gasoline stations.)

Changes that took place in the prices of petroleum derivatives during the year were more a reflection of a redistribution between the public treasury and the economy to the advantage of the public treasury, and to a lesser extent a reflection of an effective price increase; in these two cases, to emphasize, public undertakings and increased obligations to the public treasury were in one case the exclusive goal, while in the other they were far greater than the almost token price rise to the benefit of the petroleum industry.

Table 16. Price Structure of Certain Typical Petroleum Derivatives

<u>Product (and unit of measurement)</u>		<u>Net Price</u>		
		<u>Total</u>	<u>Refinery Price</u>	<u>"Allow- ance" Discount/ Markup</u>
1. Propane/butane (kg) a, d, g	(1)	4.278	1.750	--
	(2)	4.930	1.800	--
	(3)	5.150	2.020	--
	(4)	5.350	2.150	--
2. 86-octane motor gasoline b	(1)	3.465	2.615	0.550
	(2)	2.915	2.615	--
	(3)	2.915	2.615	--
	(4)	3.095	2.695	--

Table 16 (continued)

Product (and unit of measurement)		Net Price			
		Total	Refinery Price	"Allow- ance"	Discount/ Markup
3. 98-octane motor gaso- line (1) b	(1)	3.616	2.766	0.550	0.300
	(2)	3.066	2.766	--	0.300
	(3)	3.066	2.766	--	0.300
	(4)	3.250	2.850	--	0.400
4. D-2 diesel fuel (1) b	(1)	2.712	2.522	--	0.190
	(3)	2.712	2.522	--	0.190
	(4)	2.893	2.673	--	0.220
5. Household heating oil (1) b	(1)	2.674	2.484	--	0.190
	(4)	2.854	2.634	--	0.220
6. Heavy fuel oil (kg) c	(1)	1.186	1.110	--	0.076
	(4)	1.338	1.254	--	0.084
7. 40/200 asphalt in tank trucks (kg) c, e	(1)	2.098	1.907	--	0.191
	(4)	2.308	2.098	--	0.210
8. Motor oil Delta TLX 20W/40 in 1-liter cans (1) a, g	(1)	23.264	20.750	--	2.514
	(4)	24.490	21.790	--	2.700

Product (and unit of measurement)		Taxes and Fees				Retail Price
		Total	Turnover Tax	Highway Use Fee	Contribution for Shelters	
1. Propane/butane (kg) a, d, g	(1)	0.150	--	--	0.150	4.430
	(2)	0.150	--	--	0.150	5.080
	(3)	0.150	--	--	0.150	5.300
	(4)	0.150	--	--	0.150	5.500
2. 86-octane motor gasoline (1) b	(1)	3.235	2.482	0.642	0.111	6.700
	(2)	3.785	2.482	1.192	0.111	6.700
	(3)	3.985	2.682	1.192	0.111	6.900
	(4)	5.755	4.052	1.592	0.111	8.850
3. 98-octane motor gasoline (1) b	(1)	3.384	2.631	0.642	0.111	7.000
	(2)	3.934	2.631	1.192	0.111	7.000
	(3)	4.234	2.931	1.192	0.111	7.300
	(4)	5.900	4.197	1.592	0.111	9.150
4. D-2 diesel fuel (1) b	(1)	1.488	0.662	0.700	0.126	4.200
	(3)	2.188	1.362	0.700	0.126	4.900
	(4)	3.907	2.481	1.300	0.126	6.800
5. Household heating oil (1) b	(1)	0.126	--	--	0.126	2.800
	(4)	0.946	0.820	00	0.120	3.800
6. Heavy fuel oil (kg) c	(1)	0.150	--	--	0.150	1.336
	(4)	0.448	0.298	--	0.150	1.786

Table 16 (continued)

Product (and unit of measurement)	Taxes and Fees				Retail Price
	Total	Turnover Tax	Highway Use Fee	Contribution for Shelters	
7. 40/200 asphalt in (1)	--	--	--	--	2.098
tank trucks (kg) (4)	--	--	--	--	2.308
c, e					
8. Motor oil Delta (1)	8.145	8.145	--	--	31.410
TLX 20W/40 in (4)	8.570	8.570	--	--	33.060
1-liter cans (1)					
a, g					

- Notes:
- Shipping costs included in markup.
 - Shipping costs included in the refinery price.
 - This is the price for the refinery, which means that the buyer pays the shipping costs.
 - For use in households, in bottles, the price is franko the Zagreb filling station.
 - There is no tax if it is used for further processing, which is usually the case.
 - The refinery price is the weighted purchase price for the domestic refinery (1.68 and 1.848 dinars, respectively, as of 16 November) of imported gas. The discount/markup also contains earmarked funds amounting to 0.20 dinar per kilogram for shelter construction.
 - The republic and the opstina turnover tax under legislation in effect in Croatia.
 - Prices as of 1 January 1978.
 - Prices as of 1 March, as of 20 April for propane/butane.
 - Prices as of 28 July, as of 29 August for propane/butane.
 - Prices as of 16 November, as of 22 November for propane/butane.

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